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ABSTRACT

A study gathered data on the effectiveness of four phonological awareness measures in predicting reading outcome in first grade. The "Test of Non-Verbal Intelligence" (TONI) and the "Peabody Picture Vocabulary Test" (PPVT) were used to assess the cognitive abilities of 54 first-graders from a middle class elementary school in a midwestern city. Each subject was administered four tasks of phonological awareness during the first quarter of their first-grade year. Tasks were adaptations of tasks previously shown to be related to later reading ability. Outcome measures were reading tasks from the "Woodcock Reading Mastery Tests" (WRMT) and "Wide Range Achievement Test--Revised (WRAT-R)." These measures were administered during the fourth quarter of the first-grade year. Results indicated that two of the four phonological awareness tasks were more highly correlated to reading measures than were the TONI or PPVT-R. Results also showed that the "deletion" task accounted for a significant portion of word identification and word attack tasks. No other variable made a significant contribution for explaining the variance for the word identification and word attack. The "deletion" task also accounted for the most variance in WRAT-R task. Furthermore, the "deletion" task identified good readers with 85.7% accuracy and poor readers with 90.5% accuracy. These results support the effectiveness of specific phonological awareness measures in predicting first grade reading outcome. (Two tables of data are included; one appendix including deletion, categorization, blending task, and segmentation tasks is attached.) (PRA)

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Speech-language pathologists may effectively assess language abilities related to reading (Catts & Kamhi, 1986). One such ability is that of phonological awareness. Phonological awareness is defined as the explicit knowledge about the sound structure of the language (Hakes, 1982).

Various experimental tasks of phonological awareness have been utilized in research, however, it remains unclear which measures of phonological awareness will be the most effective in clinical practice with the primary school-age population. The current investigation gathered data on the effectiveness of four phonological awareness measures in predicting reading outcome in the first grade.

Method

The experimental subjects were 54 first graders drawn from a middle class elementary school in a midwestern city. None of the children had repeated a grade. Visual and audiometric examination indicated no hearing or uncorrected visual problems were represented in this group. Cognitive abilities were assessed utilizing the Test of Non-Verbal Intelligence (TONI) and the Peabody Picture Vocabulary Test (PPVT). The group mean performance on the TONI was 101, (SD = 15.6) and on the PPVT it was 95.4 (SD = 12.5).

Each subject was administered four tasks of phonological awareness during the first quarter of their first grade year. Tasks were adaptations of tasks previously shown to be related to later reading ability (Catts, Swank, McIntosh, & Stewart, 1989,

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see Appendix). Outcome measures were reading tasks from the Woodcock Reading Mastery Tests (WRMT, Woodcock, 1987, i. e., Word Identification and Word Attack) and Wide Range Achievement Test- Revised (WRAT-R, Jastak & Wilkinson, 1984, i. e., Spelling 1). These measures were administered during the fourth quarter of the first grade year.

Results and Discussion

Table 1 exhibits Pearson product moment correlations between measures of phonological awareness, intelligence, and reading. Two of the four phonological awareness tasks were more highly correlated to reading measures than the TONI or PPVT-R.

Stepwise regression analyses were utilized to assess the relative contributions of the intelligence and phonological awareness measures in predicting reading outcome. Using all phonological awareness and intelligence (i. e., TONI and PPVT-R) measures as predictor variables, the DELETION task accounted for a significant portion of the Word Identification (r^2=.34) and Word Attack (r^2=.31)tasks. No other variable made a significant contribution for explaining the variance for the Word Identification and Word Attack. The DELETION task also accounted for the most variance in WRAT-R task (r^2=.29).

A discriminant analysis was performed to compare good (i. e., scoring at or above the 67th percentile) and poor (i. e., scoring at or below the 33rd percentile) readers performance on the tasks of phonological awareness. Each of the phonological awareness measures were entered separately in the discriminant

analysis. Table 2 presents the F-values and the percentages of correct classification of reading group membership for each of the variables. The DELETION task identified good readers with 85.7% accuracy and poor readers with 90.5% accuracy.

This study supports the effectiveness of specific phonological awareness measures in predicting first grade reading outcome. Implementation of such measures in clinical practice for the identification of at-risk children for reading problems requires more specific information. Whereas, these tasks discriminate between good and poor readers, it will be necessary to develop specific norms. Implementation of procedures described in this paper could be utilized to establish such normative data.

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Table 1.
Pearson product moment correlations between phonological awareness, reading, and cognitive measures.

TASKS	WORD ID	WORD ATT	WRAT SPL
DELETION	.58	.54	.54
CATEGORIZATION	.48	.47	.54
BLENDING	.48	.54	.51
SEGMENTING	.37	.27	.41
TONI	.30	.31	.31
PPVT	.45	.39	.42

Table 2.
F-values and percentages of correct classification of reading group membership for each of the phonological awareness tasks.

Variable	F-values	Percentage Correct Classification
DELETION	26.9*	88.1%
CATEGORIZATION	18.9*	81.2%
BLENDING	17.1*	76.4%
SEGMENTING	9.4*	71.3%

* $p < .01$

Appendix

DELETION TASK

Procedures are taken from Catts, et al. (1989). The child is shown a picture of a cow and a boy's head and asked to "say cowboy". After the child responds, the examiner covers the picture of the cow and says "Now say it again, but without the cow." If correct, the examiner proceeds with the next example (picture of a tooth and a brush, "say toothbrush", following the same procedure). The same procedure is followed for the third example, "cupcake" (a picture of cup and cake). If the child fails a practice item, the examiner attempts to teach the child. The examiner then proceeds with the test items. The first 5 correct responses are reinforced and the first 5 errors are corrected. Testing is discontinued after 8 consecutive failures.

Test Stimuli:

1.	Sunday	8.	fat	15.	scream
2.	sometime	9.	seat	16.	thread
3.	baseball	10.	shout	17.	cloud
4.	return	11.	jar	18.	twin
5.	baby	12.	tall	19.	/fjew/
6.	monkey	13.	door	20.	spring
7.	person	14.	snow	21.	/skware/

CATEGORIZATION TASK

Directions: Speak clearly and distinctly emphasizing the four key words in each item. Say, "Listen carefully. I am going to say four words. One of the words begins with a sound that is different from the other words. Here is an example. If I say bag, nine, beach, bike, the word that begins with a different sound is nine. Now you try one". Give Sample item 1. Sample Item 1 Say: "Which word begins with a sound that is different from the other words; rat, roll, ring, pop?" If the child succeeds, go to Sample Item 2. If the child fails, say: "rat, roll, ring, pop. The word that has a different beginning sound is pop." Repeat Sample Item 1. Say; "which word begins with a sound that is different from the other words: rat, roll, ring, pop?" If the child succeeds go to Sample Item 2. If the child fails, say; "rat, roll, ring, pop. The word that has a different beginning sound is pop." Go to Sample Item 2. Sample Item 2 utilizes the same procedure with the target words of nut sun sing sort.

Test Stimuli:

1. not no son nice	7. cat tan time ton
2. ball bite dog beat	8. luck like lip rag
3. girl pat give go	9. fill fork ear fire
4. yes run rose round	10. safe shirt same sail
5. cap jar coat come	11. bath doll duck done
6. hand hut here fun	12. mail miss make nap

BLENDING TASK

The procedure is taken from Catts, et al. (1989). The child is introduced to a puppet and told "this puppet does not talk very well. He says words one sound at a time. Your job is to listen and say the words the right way. For example, if he says 'rein deer' you would say 'reindeer. Let's try it." The child attempts the practice items. If the child is incorrect, feedback is given. The examiner then should move on to the test items. The first five correct responses are reinforced and the first five errors are corrected. No ceiling.

Practice Stimuli: bed room suit case snow man

Test Stimuli:

1. birth day	9. s ing	17. f ee t
2. air plane	10. sh irt	18. m i ss
3. pen cil	11. m uch	19. c oa t
4. dol lar	12. g ood	20. p a ge
5. mo ther	13. t op	21. tr u ck
6. pa per	14. b ug	22. s m o ke
7. for get	15. f i sh	23. s l i p
8. f un	16. s oa p	

SEGMENTATION

This procedure was taken from Catts, et al. (1989). The instructions are as follows: "Now we are going to play a tapping game. Listen and watch how I play it." Demonstrate the practice trial 1, saying the word first, then tapping it out. Then say "Now it is your turn. I'll say a word, then you say it and then you tap it out." Correct all errors. Next, scramble the list and have the child try again, correcting all errors. Follow the same procedure with the other practice items. Then proceed to the test items. The first 5 correct responses are reinforced and the first 5 errors are corrected. No ceiling.

Practice Stimuli:

1. but	2. tell	3. top
butter	telling	water
butterfly	telephone	elephant

Test Stimuli:

1. dinner	8. sunshine	15. hamburger
2. house	9. remember	16. morning
3. together	10. cheese	17. anything
4. apple	11. Saturday	18. call
5. shoe	12. open	19. outside
6. nobody	13. building	20. dog
7. understand	14. boat	21. head